REVISIONS

LT	DESCRIPTION	DATE	APPROVED
A	Added lever operating force requirement and eliminated 135 percent calibration tripping time.	11-10-86	Randy Larson
B	Added another suggested source of supply. Added CAGE 74193.	4 Oct 89	Randy Larson
C	Corrected part numbers for vendor CAGE 81541.	21 Jun 98	Dave Moore
D	Delete P/N and substitute PIN, editorial changes, update to latest DSCC DWG format.	05 Mar 03	Kendall Cottongim

CURRENT DESIGN ACTIVITY CAGE CODE 037Z3
DEFENSE LOGISTICS AGENCY
DEFENSE SUPPLY CENTER COLUMBUS
COLUMBUS, OHIO 43216-5000

THE ORIGINAL FIRST PAGE OF THIS DRAWING HAS BEEN REPLACED.

Prepared in accordance with ASME Y14.100 Selected item drawing

REV																						
PAGE																						
REV STATUS OF PAGES	**REV**		D	D	D	D	D	D	D	D	D	D	D									
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PMIC N/A	**PREPARED BY** Dan McGrath	**DESIGN ACTIVITY** **DEFENSE ELECTRONIC SUPPLY CENTER** **DAYTON, OH 45444-5000**
Original date of drawing 31 Aug 1987	**CHECKED BY** Dan McGrath **APPROVED BY** D. E. Morgan	**TITLE** **CIRCUIT BREAKERS, MAGNETIC, LOW-POWER, SEALED, TRIP-FREE, SHOCK ENHANCED, ONE-POLE**
	SIZE **A** / **CODE IDENT. NO.** **14933**	**DWG NO.** **87054**
	REV D	**PAGE** 1 **OF** 11

AMSC N/A 5925-E058

1. SCOPE

1.1 Scope. This drawing describes the requirements for a family of circuit breakers with illuminated handles for use in overcurrent protection.

1.2 Part or Identifying Number (PIN). The complete PIN is as follows:

87054-	-001
Drawing number	Dash number

2. APPLICABLE DOCUMENTS

2.1 Government documents.

2.1.1 Specifications, standards, and handbooks. The following specifications, standards, and handbooks form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents are those listed in the issue of the Department of Defense Index of Specifications and Standards (DoDISS) and supplement thereto, cited in the solicitation (see 6.2).

SPECIFICATIONS

DEPARTMENT OF DEFENSE

DoD-D-1000 - Drawing, Engineering and Associated List.

MIL-PRF-39019 - Circuit Breakers, Magnetic, Low-Power, Sealed, Trip-Free, General Specification for

(Unless otherwise indicated, copies of above specifications, standards, and handbooks are available from the Document Automation and Production Service, Building 4D (DPM-DODSSP), 700 Robbins Avenue, Philadelphia, PA 19111-5094.)

2.2 Non-Government publications. The following document forms a part of this document to the extent specified herein. Unless otherwise specified, the issues of the documents that are DoD adopted are those listed in the issue of the DoDISS cited in the solicitation. Unless otherwise specified, the issues of documents not listed in the DoDISS are the issues of the documents cited in the solicitation (see 6.2).

SAE-AMS-QQ-N-290 - Nickel Plating (Electrodeposited).

(Application for copies of SAE Aerospace Material Specifications should be addressed to SAE, 400 Commonwealth Drive, Warrendale, PA 15096-0001.)

2.3 Order of precedence. In the event of a conflict between the text of this document and the references cited herein, the text of this document takes precedence. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

3. REQUIREMENTS

3.1 Drawing precedence. This drawing takes precedence over documents referred to herein and shall be interpreted in accordance with DoD-D-1000.

3.2 Voltage and frequency rating. 50 V dc, maximum and 240 V ac, maximum at 60 and 400 Hz.

3.3 Current rating. See table I.

3.4 Interface and physical dimension requirements. See figure 1.

3.5 Time delay. Time delay shall be in accordance with tables I, II, and III.

3.6 Shock.

3.6.1 Shock (100 g's). When circuit breakers are tested as specified in 4.2.1, main circuit breaker contacts shall not trip. There shall be no closing of open main contacts, nor opening of closed main contacts in excess of 10 μs duration, nor shall there be any evidence of mechanical or electrical damage.

3.6.2 Shock (150 g's). When circuit breakers are tested as specified in 4.2.2, the main circuit breaker contacts shall not trip. There shall be no evidence of mechanical or electrical damage.

3.6.3 Shock (200 g's). When circuit breakers are tested as specified in 4.2.3, the main circuit breaker contacts shall not trip. There shall be no evidence of mechanical or electrical damage.

3.7 Endurance. Endurance shall be in accordance with MIL-PRF-39019, except that the number of operations shall be 5,000.

3.8 Resistance or impedance. See table I.

3.9 Interrupting capacity. Interrupting capacity shall be in accordance with MIL-PRF-39019.

3.10 Dielectric withstanding voltage. Dielectric withstanding voltage shall be in accordance with MIL-PRF-39019.

3.11 Vibration. Vibration shall be in accordance with MIL-PRF-39019.

3.12 Insulation resistance. Insulation resistance shall be in accordance with MIL-PRF-39019.

3.13 Lever operating force. Lever operating force shall be in accordance with MIL-PRF-39019 except for the following: one-pole breaker - 7 pounds maximum; two-pole breaker - 10 pounds maximum; three-pole breaker - 16 pounds maximum.

3.14 Marking. Marking shall be as specified in MIL-PRF-39019, except the DSCC drawing part number in accordance with 1.2 herein shall be used instead of the military part number.

3.15 Certificate of compliance. A certificate of compliance shall be required from a manufacturer in order to be listed as a suggested source of supply (see 6.3).

3.16 Recycled, recovered, or environmentally preferable materials. Recycled, recovered, or environmentally preferable materials should be used to the maximum extent possible provided that the material meets or exceeds the operational and maintenance requirements, and promotes economically advantageous life cycle costs.

3.17 Workmanship. Parts shall be free of flash pits, voids, and excessive mild marks. Visible parting line is acceptable.

4. VERIFICATION

4.1 Conformance inspection.

4.1.1 Inspection of product for delivery. Inspection of product for delivery shall consist of group A inspections of MIL-PRF-39019.

4.1.2 Certification. The acquiring activity, at its discretion, may accept a certificate of compliance with group A requirements in lieu of performing group A tests (see 6.2c).

4.1.3 Inspection of packaging. Inspection of packaging shall be in accordance with MIL-PRF-39019.

4.2 Shock.

4.2.1 Shock (100 g's).

a. Mounting method: Normal mounting means.

b. Test condition: Method 213 of MIL-STD-202, test condition I (100 g's, 6 ms).

c. Electrical-load conditions and measurements: Of the three shocks in each direction required, two shocks shall be performed with the circuit breaker energized at 100 percent of rated current, at 12 V dc, except that for the directions with the operating lever pivot up (table mount) and the operating lever pivot down (ceiling mount), no voltage or current shall be applied. Each energized shock shall be monitored to determine opening of the main circuit breaker contacts. The remaining shock in each direction shall be performed with the circuit breaker contacts open and unenergized and shall be monitored to determine closing of the main contacts.

4.2.2 Shock (150 g's).

a. Mounting method: Normal mounting means.

b. Test condition: Special.

(1) Peak: 150 g's.

(2) Duration: 6 ms.

(3) Waveform: Sawtooth.

c. Electrical-load conditions and measurements: Of the three shocks in each direction required, all shocks shall be performed with the circuit breaker energized at 100 percent of rated current at 12 V dc, except that for the directions with the operating lever pivot up (table mount), and the operating lever pivot down: (ceiling mount), no voltage or current shall be applied.

4.2.3 Shock (200 g's).

a. Mounting method: Normal mounting means.

b. Test condition: Special.

(1) Peak: 200 g's.

(2) Duration: 1.5 ms.

(3) Waveform: Half-sine.

c. Electrical-load conditions and measurements: Of the three shocks in each direction required, all shocks shall be performed with the circuit breaker energized at 100 percent rated current at 12 V dc, except that for the directions with the operating lever pivot up (table mount) and the operating lever pivot down (ceiling mount), no voltage or current shall be applied.

5. PACKAGING

5.1 Packaging. For acquisition purposes, the packaging requirements shall be as specified in the contract or order (see 6.2). When actual packaging of materiel is to be performed by DoD personnel, these personnel need to contact the responsible packaging activity to ascertain requisite packaging requirements. Packaging requirements are maintained by the Inventory Control Point's packaging activity within the Military Department or Defense Agency, or within the Military Department's System Command. Packaging data retrieval is available from the managing Military Departments or Defense Agency's automated packaging files, CD-ROM products, or by contacting the responsible packaging activity.

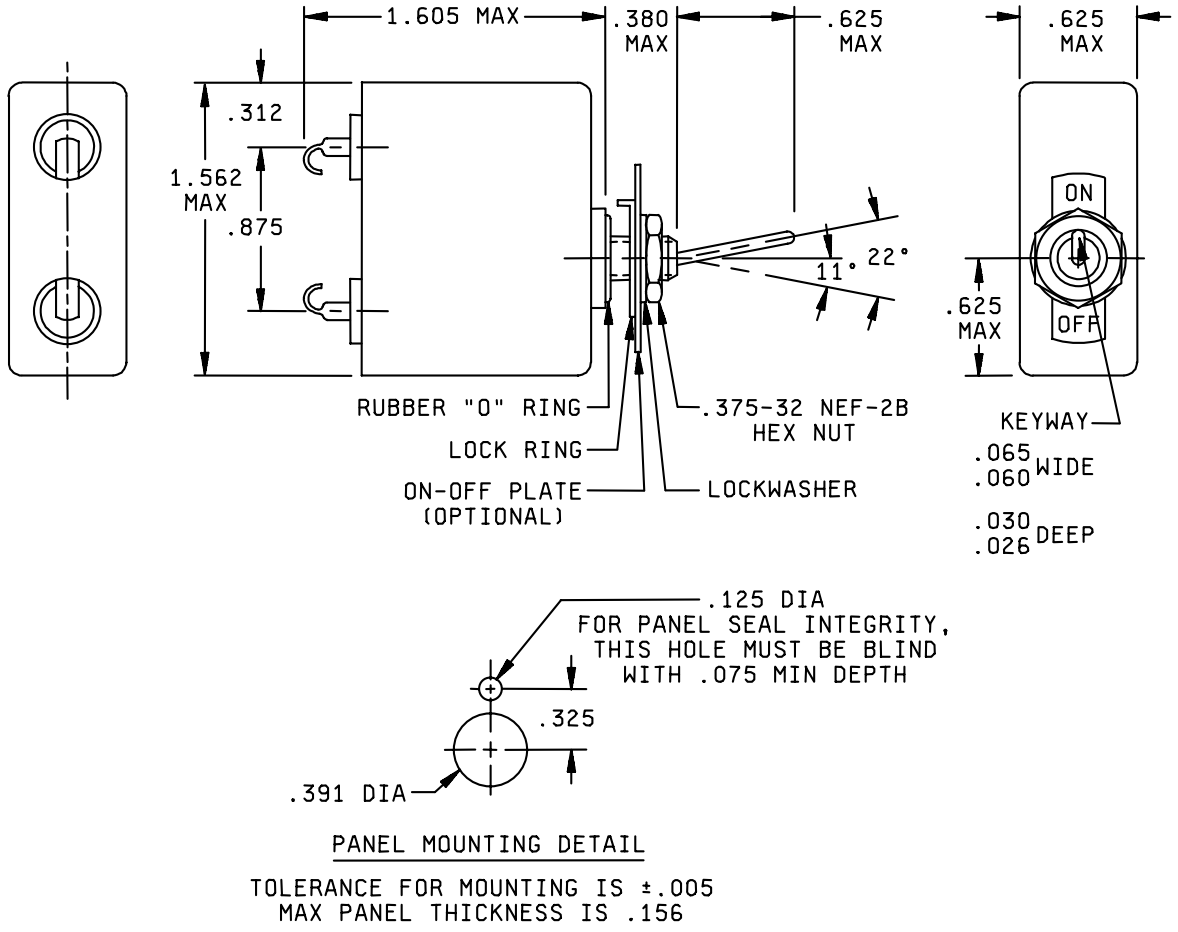

FIGURE 1. Dimensions and configurations.

DEFENSE ELECTRONIC SUPPLY CENTER DAYTON, OHIO	SIZE A	CODE IDENT NO. 14933	DWG NO. 87054
		REV D	PAGE 5

Inches	mm	Inches	mm
.005	0.12	.325	8.25
.010	0.25	.375	9.52
.025	0.64	.380	9.65
.026	0.66	.382	9.70
.030	0.76	.391	9.93
.031	0.78	.392	9.95
.060	1.52	.493	12.52
.065	1.65	.500	12.70
.075	1.91	.507	12.87
.093	2.36	.625	15.88
.125	3.18	.875	22.23
.156	3.96	1.562	39.67
.280	7.11	1.605	40.77
.312	7.92		

NOTES:
1. Dimensions are in inches.
2. Metric equivalents are given for general information only.
3. Unless otherwise specified, tolerance is ±.031 ±5° on angles.
4. Envelope design optional.
5. Hex mounting nut .375-32 UNEF-2B thread, .500 ±.010 across flats, .093 ±.005 thick, brass nickel plated, SAE-AMS-QQ-N-290 nonglare, or stainless steel.
6. Internal tooth lockwasher, .507/.493 0.D., .392/.382 I.D., .025 ±.005 thick, stainless steel.
7. The effective bushing thread length (not including mounting hardware) is .280 minimum.
8. Marking may appear on any surface except the mounting surface.
9. Lock ring not required if on-off plate has locking tab.
10. Numerical marking optional on circuit diagram.

FIGURE 1. Dimensions and configuration - Continued.

TABLE I. Circuit breaker dash number and applicable characteristics.

P/N 87054	Current rating (amps)	Time delay 1/	Resistance or impedance (ohms - max) 2/			P/N 87054	Current rating (amps)	Time delay 1/	Resistance or impedance (ohms - max) 2/		
			DC	60 Hz	400 Hz				DC	60 Hz	400 Hz
001	0.05	A	680.0	690.0	710.0	023	4.0	A	0.10	0.10	0.12
002	0.05	B	680.0	690.0	710.0	024	4.0	B	0.10	0.10	0.12
003	0.1	A	150.0	170.0	180.0	025	5.0	A	0.061	0.063	0.072
004	0.1	B	150.0	170.0	180.0	026	5.0	B	0.061	0.063	0.072
005	0.25	A	20.0	26.0	27.0	027	6.0	A	0.042	0.043	0.050
006	0.25	B	20.0	26.0	27.0	028	6.0	B	0.042	0.043	0.050
007	0.5	A	5.4	6.0	6.6	029	7.0	A	0.036	0.036	0.040
008	0.5	B	5.4	6.0	6.6	030	7.0	B	0.036	0.036	0.040
009	0.75	A	2.5	2.7	2.8	031	7.5	A	0.031	0.031	0.038
010	0.75	B	2.5	2.7	2.8	032	7.5	B	0.031	0.031	0.038
011	1.0	A	1.35	1.5	1.61	033	8.0	A	0.027	0.027	0.035
012	1.0	B	1.35	1.5	1.61	034	8.0	B	0.027	0.027	0.035
013	1.25	A	0.9	1.0	1.1	035	9.0	A	0.022	0.022	0.028
014	1.25	B	0.9	1.0	1.1	036	9.0	B	0.022	0.022	0.028
015	1.5	A	0.65	0.70	0.75	037	10.0	A	0.018	0.021	0.024
016	1.5	B	0.65	0.70	0.75	038	10.0	B	0.018	0.021	0.024
017	2.0	A	0.40	0.40	0.50	039	12.5	A	0.012	0.013	0.015
018	2.0	B	0.40	0.40	0.50	040	12.5	B	0.012	0.013	0.015
019	2.5	A	0.25	0.25	0.27	041	15.0	A	0.009	0.009	0.010
020	2.5	B	0.25	0.25	0.27	042	15.0	B	0.009	0.009	0.010
021	3.0	A	0.15	0.15	0.17	043	20.0	A	0.006	0.006	0.007
022	3.0	B	0.15	0.15	0.17	044	20.0	B	0.006	0.006	0.007

1/ All dash numbers include inertial delay with the time delay.
2/ The corresponding maximum wattage losses, which in no case shall exceed 3.0 watts, may be calculated as I^2R or I^2Z.

TABLE II. Calibration tripping times (seconds) at 25°C ±2°C.

Percent of rated current	Time delay A (fast)		Time delay B (slow)	
	Min	Max	Min	Max
100	No trip 1 hour	No trip 1 hour	No trip 1 hour	No trip 1 hour
150	0.2	7.0	3.0	70.0
200	0.055	2.0	0.5	20.0
400	Inst 1/	0.24	Inst 1/	1.75
600	Inst 1/	0.13	Inst 1/	0.6
800	Inst 1/	0.06	Inst 1/	0.1 2/
800 at 60Hz 3/	No trip	No trip	No trip	No trip
1,400 at 400 Hz 4/	No trip	No trip	No trip	No trip

1/ (Inst) instantaneous is defined as less than 0.015 second.
2/ This time is extended to 0.3 second for dc and 400 Hz.
3/ 800 percent peak, one 1/2 sine pulse at 60 Hz.
4/ 1,400 percent peak, one 1/2 sine pulse at 400 Hz.

TABLE III. High and low temperature tripping times (seconds).

Percent of rated current	Time delay A (fast)		Time delay B (slow)	
	-40°C ±2°C	+100°C ±2°C	-40°C ±2°C	+100°C ±2°C
	Min	Max	Min	Max
100	No trip 1 hour	No trip 1 hour	No trip 1 hour	No trip 1 hour
150	800.0	---	1000.0	---
200	10.0	0.015	50.0	0.04
400	0.7	Inst 1/	10.0	Inst 1/
500	0.5	Inst 1/	2.0	Inst 1/
800	0.06	Inst 1/	0.1 2/	Inst 1/
800 at 60 Hz 3/	No trip	No trip	No trip	No trip
1,400 at 400 Hz 4/	No trip	No trip	No trip	No trip

1/ (Inst) instantaneous is defined as less than 0.015 second.
2/ This time is extended to 0.3 second for dc and 400 Hz.
3/ 800 percent peak, one 1/2 sine pulse at 60 Hz.
4/ 1,400 percent peak, one 1/2 sine pulse at 400 Hz.

6. NOTES

(This section contains information of a general or explanatory nature that may be helpful, but is not mandatory.)

6.1 Intended use. Devices conforming to this drawing are intended for use when military specifications do not exist and qualified military devices that will perform the required function are not available for OEM application.

6.2 Ordering data. The acquisition document should specify the following:

a. Complete PIN (see 1.2).

b. Requirements for delivery of one copy of the conformance inspection data with each shipment of parts by the manufacturer.

c. Whether the manufacturer performs the group A tests or provides certification of compliance with group A requirements.

d. Requirements for notification of change of product to the contracting activity, if applicable.

c. Requirements for packaging and packing.

6.3 Suggested sources of supply. Suggested sources of supply are listed herein. Additional sources will be added as they become available. For assistance in the use of this drawing, contact Defense Supply Center, Columbus, ATTN: DSCC-VAT, Post Office Box 3990, Columbus, OH 43216-5000 or by telephone (614)-692-0556 or DSN 850-0556.

DSCC drawing PIN 87054- 1/	Similar vendor part number	Vendor name and address
	CAGE 81541	
001	AP1-87054-001	
002	AP1-87054-002	
003	AP1-87054-003	
004	AP1-87054-004	
005	AP1-87054-005	
006	AP1-87054-006	
007	AP1-87054-007	
008	AP1-87054-008	
009	AP1-87054-009	
010	AP1-87054-010	
011	AP1-87054-011	
012	AP1-87054-012	
013	AP1-87054-013	
014	AP1-87054-014	
015	AP1-87054-015	
016	AP1-87054-016	
017	AP1-87054-017	
018	AP1-87054-018	
019	AP1-87054-019	
020	AP1-87054-020	
021	AP1-87054-021	Airpax Corporation
022	AP1-87054-022	Woods Road, PO Box 520
023	AP1-87054-023	Cambridge, MD 21613-0520
024	AP1-87054-024	Phone: 301-228-4600
025	AP1-87054-025	
026	AP1-87054-026	
027	AP1-87054-027	
028	AP1-87054-028	
029	AP1-87054-029	
030	AP1-87054-030	
031	AP1-87054-031	
032	AP1-87054-032	
033	AP1-87054-033	
034	AP1-87054-034	
035	AP1-87054-035	
036	AP1-87054-036	
037	AP1-87054-037	
038	AP1-87054-038	
039	AP1-87054-039	
040	AP1-87054-040	
041	AP1-87054-041	
042	AP1-87054-042	
043	AP1-87054-043	
044	AP1-87054-044	

1/ Parts must be purchased to this DSCC PIN to assure that all performance requirements and tests are met.

DSCC drawing PIN 87054- 1/	Similar vendor part number	Vendor name and address
	CAGE 74193	
001	HM1-229-001	
002	HM1-229-002	
003	HM1-229-003	
004	HM1-229-004	
005	HM1-229-005	
006	HM1-229-006	
007	HM1-229-007	
008	HM1-229-008	
009	HM1-229-009	
010	HM1-229-010	
011	HM1-229-011	
012	HM1-229-012	
013	HM1-229-013	
014	HM1-229-014	
015	HM1-229-015	
016	HM1-229-016	
017	HM1-229-017	
018	HM1-229-018	
019	HM1-229-019	
020	HM1-229-020	
021	HM1-229-021	Heinemann Electric Company
022	HM1-229-022	2600 Brunswick Pike
023	HM1-229-023	Lawrenceville, NJ 08648-0800
024	HM1-229-024	
025	HM1-229-025	
026	HM1-229-026	
027	HM1-229-027	
028	HM1-229-028	
029	HM1-229-029	
030	HM1-229-03	
031	HM1-229-031	
032	HM1-229-032	
033	HM1-229-033	
034	HM1-229-034	
035	HM1-229-035	
036	HM1-229-036	
037	HM1-229-037	
038	HM1-229-038	
039	HM1-229-039	
040	HM1-229-040	
041	HM1-229-041	
042	HM1-229-042	
043	HM1-229-043	
044	HM1-229-044	

1/ Parts must be purchased to this DSCC PIN to assure that all performance requirements and tests are met.